(No Model.)

E. D. ARNOLD.

HARROW DISK.

No. 488,514. Patented Dec. 20, 1892.

Fig. 1.

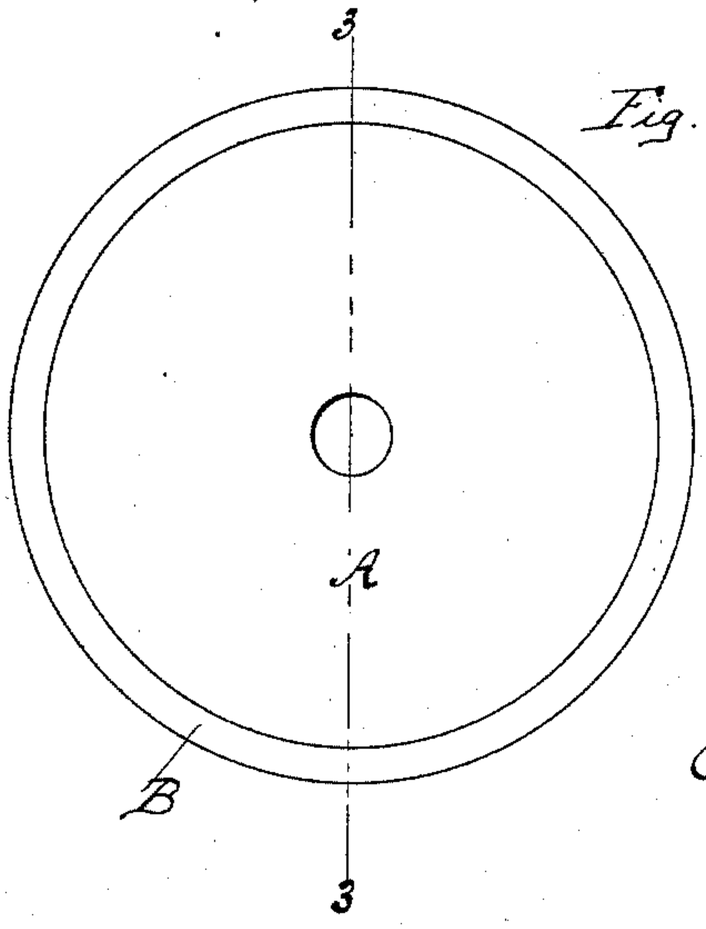


Fig. 2.

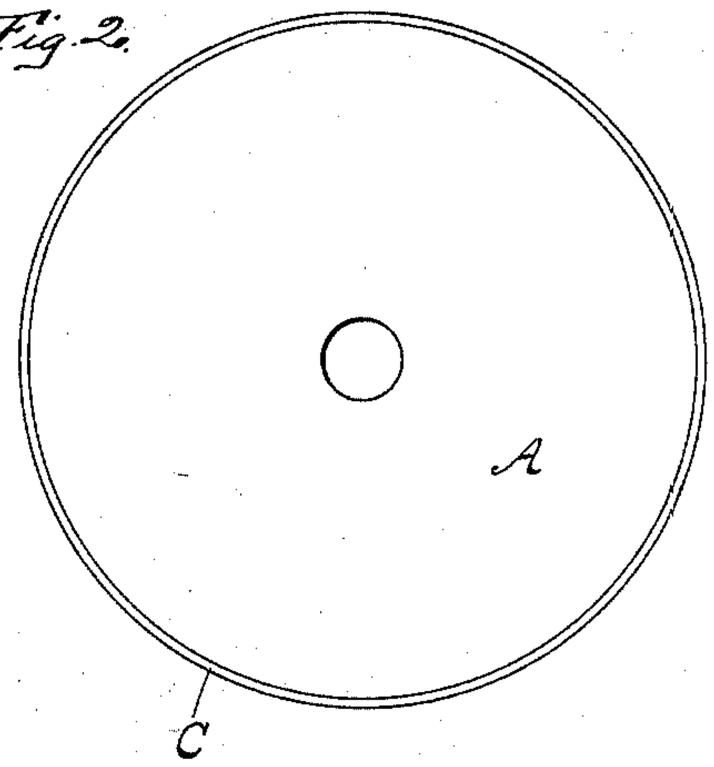


Fig. 3.

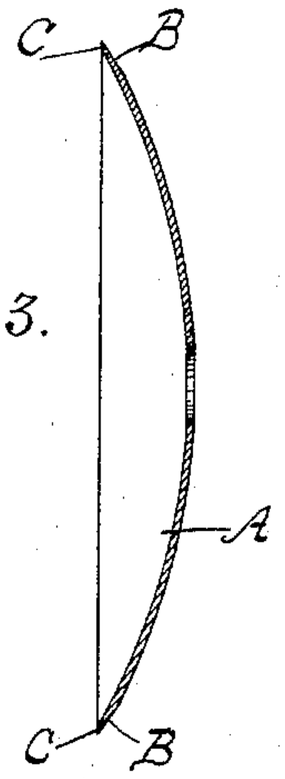


Fig. 4.

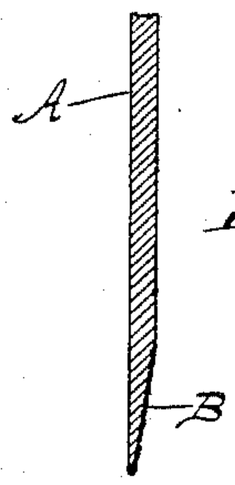


Fig. 5.

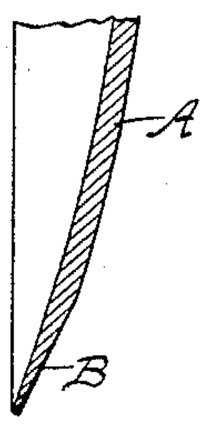
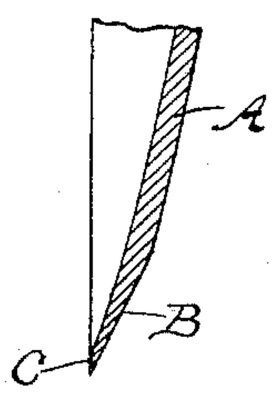


Fig. 6.



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Inventor:
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UNITED STATES PATENT OFFICE.

EVERETT D. ARNOLD, OF TROY, NEW YORK, ASSIGNOR TO THE TROY STEEL AND IRON COMPANY, OF SAME PLACE.

HARROW-DISK.

SPECIFICATION forming part of Letters Patent No. 488,514, dated December 20, 1892.

Application filed November 5, 1891. Serial No. 410,970. (No model.)

To all whom it may concern:

Be it known that I, EVERETT D. ARNOLD, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Harrow-Disks, of which the following is a specification.

My invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a plan view of the outer or convexed side of my improved harrow-disk. Fig. 2 is a plan view of the inner or concaved side of the same. Fig. 3 is a central cross-section of the same taken at the broken line 3—3, in Fig. 1. Fig. 4 is a similar section of a portion of a plane disk after its peripheral edge has been hammered. Fig. 5 is a similar section of a concavo-convex disk, after its peripheral edge has been hammered on the convex side and before the edge has been ground on the concave side. Fig. 6 is a similar section of a portion of a concavo-convex disk having its peripheral edge hammered on the convex side and ground on the concave side. The last three figures are drawn upon an enlarged scale.

My invention relates to that class of metallic harrow-disks which are made from a circular sheet or thin plate of wrought metal pressed into the form of a concavo-convex disk and provided with a peripheral cutting edge. The cutting edge has been formed heretofore by cutting grinding or rolling the peripheral edge of the disk, or by combining some of these operations.

Harrow-disks, when in use, are mounted upon a shaft that is so inclined to the line of draft as to cause the individual disks to present their convex side to the front to engage the soil. The convex side is therefore the working side, the concave side serving to aid in supporting and strengthening the disk. It is desirable to make the parts which directly engage the soil as hard as possible, without subjecting them to the danger of chipping or breaking in stony ground.

I have ascertained that by hammering the peripheral portion of the disk on the convex side, or the side to be convexed, I am able to produce on that side of the disk a very hard case or skin that will offer great wearing resistance to the soil, which hardened case extends over the whole hammered surface and to the extreme cutting edge of the disk, while the other or concave side is left comparatively soft and pliable, a condition well adapted to aid the hardened portion in withstanding shocks or blows, such as would break or chip a hard metal.

I am aware that cast-iron mold-boards for plows have been case-hardened by chilling the casting, but the mold-boards of plows are not provided with a cutting edge, and a cast-iron harrow-disk, if made strong enough to be durable, would be too thick to readily pass through the soil and too heavy to be of practical use. Mold-boards have also been made of highly tempered steel welded upon iron strengthening plates. Such a form of construction is not adapted for earth-cutting blades for the reason that when the cutting edge of the blade should become partially worn by use, the support of the harder metal would be weakened so that the latter would chip and break away, leaving a blunt edge. Defective welding would also cause the two metals to chip or scale off, one from the other. Whereas a hammer-hardened case on an integral disk of wrought metal is not sufficiently well defined and separated from the body part of the disk to chip or scale off, but wears away gradually and evenly with its underlying support, maintaining a sharp cutting edge as the peripheral parts wear away.

Harrow-disks are almost universally made of wrought metal and preferably of rolled plates or sheets of low-carbon steel.

After many experiments, I am convinced that a hammer-hardened case is the only successful shield which can be practically applied to the wearing parts of a wrought-metal harrow-disk. The hammer-hardened case serves to materially increase the life of the disk and the efficiency of its cutting edge.

The edge can be sharpened from time to time by bevel-grinding or cutting the softer side of the peripheral portion of the disk, which maintains the sharp cutting edge within the hammer-hardened case.

Referring to the drawings, A—represents my improved disk, preferably cut from a sheet of rolled steel in any known manner adapted to give it a circular outline and an approximately plane surface. The disk is then hammered, in a hot or cold condition, along its peripheral edge on one side of the disk, until the beveled edge, B, is produced, and the desired degree of hardness is imparted to the metal beneath the hammered surface. The disk is then convexed by suitable dies, in the usual manner, so that the hammered surface is located on the convex side. The edge on the concave side is then cut or ground in a lathe which reduces it from the blunt or dull condition shown in Fig. 5, to the sharp cutting edge shown in Fig. 6. The grinding or cutting process produces a beveled surface, C, on the concave side of the disk along its periphery.

The disk is provided with a central aperture adapted to receive the supporting shaft in the harrow.

The cutting edge can be maintained in a sharp condition by applying from time to time, as required, the grinding or other process which cuts away the metal on the concave side of the disk.

The method of making harrow-disks herein shown and described, is not claimed in this application, but is made the subject matter of, and claimed in a separate application filed herewith.

What I claim as new and desire to secure by Letters Patent is

1. A concavo-convex harrow-disk provided with a peripheral cutting edge and composed of an integral plate of wrought metal, having a hammer-hardened case on the peripheral portion of the convex side of the disk, substantially as described.

2. A concavo-convex harrow-disk composed of an integral plate of wrought metal having its peripheral portion hammer-hardened on the convex side of the disk, and bevel ground or cut on the concave side of the disk, whereby the peripheral portion of the disk is provided with a hammer-hardened case on the convex side of the disk, and with a cutting edge on the peripheral edge of the hardened case, substantially as described.

In testimony whereof I have hereunto set my hand this 28th day of October, 1891.

E. D. ARNOLD.

Witnesses:
GEO. A. MOSHER,
FRANK C. CURTIS.